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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,604	11/20/2003	Lawrence R. Sita	1797.054001	7178

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EXAMINER

LEE, RIP A

ART UNIT PAPER NUMBER

1713

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/716,604

Applicant(s)

SITA ET AL.

Examiner

Rip A. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-29 is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-11, and 30-34 is/are rejected.
- 7) ☒ Claim(s) 4-6 and 12-19 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11-18-04; 03-25-04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 9-11, and 30-34 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 01/30858 to Sita *et al.*

The prior art of Sita *et al.* discloses catalyst components having the basic structural parameters set forth in the present claims. One observes in claim 1 group 4 ($M = \text{Ti, Zr, or Hf}$) organometallic complexes containing an optionally substituted cyclopentadienyl ligand and an amidinate ligand in which alkyl substituent R^4 is bound to the central carbon atom. Methyl groups serve as ancillary ligands. According to the specification, the term alkyl includes ethyl and *n*-propyl groups (page 9, line 16). Those metal complexes in which R^4 is an ethyl or *n*-propyl group are described accurately by the present claims, and therefore, the present invention is anticipated by the prior art. Ring substituents R^1 are independently hydrogen (*i.e.*, unsubstituted cyclopentadienyl) or alkyl. Use of pentamethylcyclopentadienyl is shown in the examples. Claim 1 also discloses the identity of the co-activator as $[A^+][BR^5_4]$ or BR^5_3 , and this is identical to the claimed co-catalyst. A

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particularly preferred co-catalyst is $[\text{PhNMe}_2\text{H}][\text{B}(\text{C}_6\text{F}_5)_4]$, as shown in claim 3 of the patent. The catalyst (organometallic complex and co-catalyst) is used for polymerization of olefins in which the olefin is contacted with the catalyst under polymerization conditions (claims 6-8). Examples of olefin include 1-hexene, 3-methylbutene, vinylcyclohexene, and others (col. 10, lines 20-25). Furthermore, the invention also teaches use of the catalyst in the preparation of block copolymers derived from two or more olefins (claim 9).

3. Claims 1-3, 7-11, and 30-34 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,579,998 to Sita *et al.*

The prior art of Sita *et al.* discloses catalyst components having the basic structural parameters set forth in the present claims. One observes, in claim 1, group 4 ($M = \text{Ti}, \text{Zr},$ or Hf) organometallic complexes containing an optionally substituted cyclopentadienyl ligand and an amidinate ligand in which alkyl or an optionally substituted alkphenyl substituent R^4 is bound to the central carbon atom. Ancillary ligands R^5 are alkyl, cycloalkyl, aryl, *etc.* According to the specification, the term alkyl includes ethyl and *n*-propyl groups (col. 9, lines 19-22), and the term alkaryl refers to groups such as benzyl, 2-phenethyl, 2-/3-phenylpropyl, and 2-/3-phenylbutyl (col. 10, lines 5). Those metal complexes in which R^4 is an ethyl, *n*-propyl, benzyl, 2-phenethyl, 2-/3-phenylpropyl, or 2-/3-phenylbutyl group are described accurately by the present claims, and therefore, the present invention is anticipated by the prior art. Ring substituents R^1 are independently hydrogen (*i.e.*, unsubstituted cyclopentadienyl) or alkyl. Use of pentamethylcyclopentadienyl is shown in the examples. The term optionally substituted, in reference to the substituent R^4 , refers to electron donating or withdrawing groups such as

halo, ketone, ester, amino, hydroxy, alkoxy, amide, *inter alia* (see col. 9, lines 29-36, 43-50, 60-66 and col. 10, lines 7-14). The reference also discloses the identity of the co-activator as $[A^+][BR^5_4]$ or BR^5_3 , and this is identical to the claimed co-catalyst (col. 6, line 33). A particularly preferred co-catalyst is $[PhNMe_2H][B(C_6F_5)_4]$, as shown in col. 6, line 58. The catalyst (organometallic complex and co-catalyst) is used for polymerization of olefins in which the olefin is contacted with the catalyst under polymerization conditions (see examples 1 and 2 in which the olefin is 1-hexene and vinylcyclohexene, respectively). Furthermore, the invention also teaches use of the catalyst in the preparation of block copolymers derived from two or more olefins (example 4).

Allowable Subject Matter

4. Claims 4-6 and 12-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The claims listed above describe meaningful developments of the present invention. In particular, the claimed subject matter relates to pre-catalysts in which substituent R^4 is functionalized such that the organometallic may be attached covalently to an inert support, as well as the final supported complex. None of the cited references fairly suggests the claimed subject matter, and one of ordinary skill in the art would not have found it obvious to modify the teachings of the prior art in order to arrive at the subject matter of the present claims.

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5. The following is a statement of reasons for the indication of allowable subject matter: Claims 20-29 are drawn to a process of preparing a polymerization catalyst by deprotonating a metal acetamidinate followed by reaction with an appropriate electrophile. The claimed process is not taught in the prior art.

6. The prior art made of record but not relied upon is considered pertinent to the Applicant's disclosure. The following references have been cited to show the state of the art with respect to amidinate-based pre-catalysts.

U.S. Patent No. 5,527,752 to Reichle *et al.*

U.S. Patent No. 5,502,128 to Flores *et al.*

Other relevant documents include:

Jayaratne *et al.* *J. Am. Chem. Soc.* **2001**, *123*, 10754-10755

Keaton *et al.* *J. Am. Chem. Soc.* **2001**, *123*, 6197-6198

Keaton *et al.* *J. Am. Chem. Soc.* **2000**, *122*, 12909-12910

Jayaratne *et al.* *J. Am. Chem. Soc.* **2000**, *122*, 10490-10491

Jayaratne *et al.* *J. Am. Chem. Soc.* **2000**, *122*, 958-959

Koterwas *et al.* *Organometallics* **1999**, *18*, 4183-4190

Sita *et al.* *Organometallics* **1998**, *17*, 5228-5230

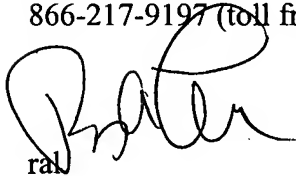
U.S. 2004/0198930 to Sita *et al.*

U.S. 2004/0186253 to Sita

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



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February 11, 2005